PATENT ABSTRACTS OF JAPAN

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(54) AQUEOUS INK

(57)Abstract:

PROBLEM TO BE SOLVED: To provide aqueous ink capable of producing ink exhibiting less blur and highly developed colors on an ordinary paper and having a fixing property in addition to sufficient color development on an exclusive paper, and in an inkjet recording, further excellent in ejecting stability and capable of securing a sufficient line width in printing.

SOLUTION: This aqueous ink is characterized by adding at least a coloring agent and a compound expressed by formula (1).

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

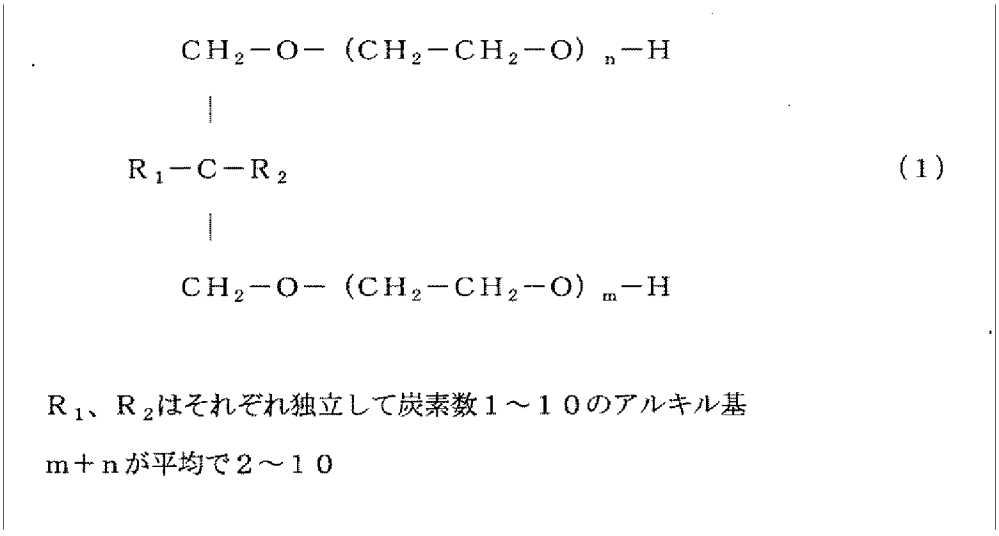
CLAIMS

[Claim(s)]

[Claim 1]

A water-based ink which contains a compound shown in a coloring material and a following formula (1) at least, and is characterized by things.

[Formula 1]



[Claim 2]

The water-based ink according to claim 1 which contains a surface-active agent further and is characterized by things.

[Claim 3]

The water-based ink according to claim 1 or 2 which contains glycol ether further and is characterized by things.

[Claim 4]

The water-based ink according to any one of claims 1 to 3 which contains 1 and 2-alkylene glycol further and is characterized by things.

[Claim 5]

The water-based ink according to any one of claims 1 to 4 which contains 2-pyrrolidone further and is characterized by things.

[Claim 6]

The water-based ink according to any one of claims 1 to 5 which contains a moisturizer further and is characterized by things.

[Claim 7]

The water-based ink according to any one of claims 1 to 6 which contains a chelating agent further and is characterized by things.

[Claim 8]

The water-based ink according to any one of claims 1 to 7 which contains an antiseptic further and is characterized by things.

[Claim 9]

The water-based ink according to any one of claims 1 to 8 which contains a

rust-proofer further and is characterized by things.

[Claim 10]

The water-based ink according to claim 2, wherein said surface-active agent is one or more sorts chosen from an acetylene glycol system surface-active agent, an acetylene alcohol system surface-active agent, and a silicon system surface-active agent.

[Claim 11]

The water-based ink according to claim 3 in which said glycol ether is alkylene glycol monoalkyl ether.

[Claim 12]

The water-based ink according to claim 11 said alkylene glycol monoalkyl ether's being ten or less-repeating unit alkylene glycol, and being alkyl ether of the carbon numbers 5-11.

[Claim 13]

The water-based ink according to claim 12, wherein said alkylene glycol monoalkyl ether is JI (Tori) ethylene glycol monobutyl ether and/or (**) propylene glycol monobutyl ether.

[Claim 14]

The water-based ink according to claim 4 said 1 and whose 2-alkylene glycol are a with an or more 4 carbon number [or less 10] straight chain or the branching 1,

and 2-alkylene glycol.

[Claim 15]

The water-based ink according to claim 6, wherein said moisturizer is a substance which has hydroxyl two or more.

[Claim 16]

A substance which it has two or more said hydroxyl Glycerin, a diethylene glycol, The water-based ink according to claim 15 which is one or more sorts chosen from triethylene glycol, tetraethylene glycol, a with a number average molecular weight of 400 or less polyethylene glycol, a TORIMECHI roll alkane (six or less carbon number), an aldose, ketose, and sugar-alcohol.

[Claim 17]

Said chelating agent Ethylenediaminetetraacetic acid, hydroxyethylenediamine triacetic acid, The water-based ink according to claim 7 being glycol etherdiamine 4 acetic acid, nitrilotriacetic acid, hydroxy ethylimino diacetic acid, a dihydroxyethyl glycine, diethylenetriamine pentaacetic acid, triethylenetetramine 6 acetic acid, and those salts.

[Claim 18]

The water-based ink according to claim 8, wherein said antiseptic is one or more sorts chosen from isothiazolone, alkyl iso thiazolone, KURORU alkyl iso thiazolone, benziso thiazolone, bromonitroalcohol, an oxazolidine system

compound, and a KURORU xylenol.

[Claim 19]

The water-based ink according to claim 9, wherein said rust-proofers are dicyclohexyl ammonium nitrate and/or benzotriazol.

[Claim 20]

The water-based ink comprising according to claim 10, 13, or 14:

One or more sorts chosen from said acetylene glycol system surface-active agent, an acetylene alcohol system surface-active agent, and a silicon system surface-active agent at least.

One or more sorts chosen from JI (Tori) ethylene glycol monobutyl ether, (**) propylene glycol monobutyl ether and a with an or more 4 carbon number [or less 10] straight chain or the branching 1, and 2-alkylene glycol.

[Claim 21]

The water-based ink according to any one of claims 1 to 20, wherein said coloring material is an organic color or an inorganic pigment.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

This invention relates to the water-based ink where high print quality is acquired to a regular paper, recycled paper, or coat paper and which is excellent in preservation stability.

[0002]

[Description of the Prior Art]

Ink jet recording is the method of breathing out ink as a glob from a detailed nozzle, and recording a character and a figure on a body surface to be recorded. An electrical signal is changed into a machinery signal, using an electrostriction element as an ink jet recording method, How to breathe out intermittently the ink stored in the nozzle head portion, and record a character and a sign on a body surface to be recorded, The part very near a regurgitation portion is quickly heated for the ink stored in the nozzle head portion, a bubble is generated, it breathes out intermittently by cubical expansion with the bubble, and the method of recording a character and a sign on a body surface to be recorded, etc. are put in practical use.

[0003]

In printing to the paper whose ink used for such ink jet recording is a recording

body, The characteristics, like the color which adjoined each other in printing of multicolor systems, such as that there is no blot, that drying property is good, that it is uniformly printable to various body surfaces to be recorded, and color printing, is not mixed are demanded.

[0004]

In conventional ink, many of ink especially using paints is mainly stopping perviousness, the wetting of ink to a paper face is stopped, and examination which secures print quality is made and put in practical use by stopping an ink droplet near the paper face.

[0005]

However, in the ink which stops the wetting to paper, the blot resulting from the difference of the wetting characteristic of ink to each of that ingredient occurs with the recycled paper with which the ingredient of the paper in which differences of the blot by the difference in a paper type are large especially various is mixed. In such ink, desiccation of printing takes time and it has the technical problem that the color which adjoined each other in printing of multicolor systems, such as color printing, will carry out mixed colors, and further, in ink using paints as a color material, in order that paints may remain in the surfaces, such as paper, the technical problem that scuff resistance worsens also occurs.

[0006]

In order to solve such a technical problem, to raise the perviousness to the paper of ink is tried, Addition of diethylene-glycol monobutyl ether (refer to patent documents 1), What (refer to patent documents 3) both addition (refer to patent documents 2) of SAFI Norian 465 (made by Nissin Chemical) which is a surface-active agent of an acetylene glycol system or diethylene-glycol monobutyl ether, and SAFI Norian 465 are added for is examined. Or using the ether of a diethylene glycol for ink etc. is examined (refer to patent documents 4).

[0007]

Generally in the ink using paints, improving the perviousness of ink, securing the dispersion stability of paints Since [difficult] the width of selection of a penetrating agent is narrow, The combination of glycol ether and paints has conventionally the example (refer to patent documents 5) which used triethylene glycol monomethyl ether for paints, an example (refer to patent documents 6) using the ether of ethylene glycol, a diethylene glycol, or triethylene glycol, etc.

[0008]

As a method of covering the surface of a coloring matter with polymers, How (refer to patent documents 7) to use the microcapsule which included dye ink as ink for ink jet printers, How (refer to patent documents 8) to use the coloring matter which made the solvent insoluble to water dissolve or distribute coloring

matter, and emulsified this underwater with the surface-active agent and which **********ed, How to use a microcapsule for recording ink for the intension thing which made at least one sort of water, a water-soluble solvent, and polyester dissolve or distribute a sublimability disperse dye (refer to patent documents 9), The method (refer to patent documents 11) by the ink composition (refer to patent documents 10), and the phase-inversion-emulsification reaction and acid precipitation method which consist of colored emulsion-polymerization particles and aquosity material is examined.

[0009]

[Patent documents 1]

U.S. Pat. No. 5156675 specification

[Patent documents 2]

U.S. Pat. No. 5183502 specification

[Patent documents 3]

U.S. Pat. No. 5196056 specification

[Patent documents 4]

U.S. Pat. No. 2083372 specification

[Patent documents 5]

JP,56-147861,A

[Patent documents 6]

JP,9-111165,A

[Patent documents 7]

JP,62-95366,A

[Patent documents 8]

JP,1-170672,A

[Patent documents 9]

JP,5-39447,A

[Patent documents 10]

JP,6-313141,A

[Patent documents 11]

JP,10-140065,A

[0010]

[Problem(s) to be Solved by the Invention]

However, print quality was insufficient, and when the conventional water-based ink was printed on regular papers, such as a PPC sheet, there were many blots, and the depth of shade and color enhancement were also insufficient [the water-based ink]. 00 conventional dispersing elements are unstable, when the substance which has a hydrophilic part and canal parts, such as a surface-active agent and glycol ether, exists, adsorption and desorption happen easily and the

technical problem that the preservation stability of the water-based ink is inferior occurs. Since the usual water-based ink reduces the blot to paper, the substance which has a hydrophilic part and canal parts, such as a surface-active agent and glycol ether, is required for it. The perviousness to paper became insufficient in the ink which does not use these substances, in order to perform uniform printing, the paper type was restricted, and the technical problem that it became easy to cause the fall of a printing image occurred.

[0011]

an additive agent (acetylene glycol.) which is used for the conventional dispersing element by this invention Acetylene alcohol and the surface-active agent of a silicon system, JI (Tori) ethylene glycol monobutyl ether, (**) If propylene glycol monobutyl ether or 1, and 2-alkylene glycol or these mixtures are used, long-term preservation stability will not be acquired, Since the remelting nature of ink was bad, it had the technical problem that ink dried and it became easy to get it blocked with the nozzle of an ink jet head, the nib of pens and pencils, etc.

[0012]

The survival of the dispersing agent remained into the ink system, a dispersing agent did not fully contribute to distribution, but was desorbed from paints, and the paints distributed by such a dispersing agent had the technical problem that

it will become what has high viscosity. If viscosity becomes high, the addition of color materials, such as paints, will especially be restricted and sufficient image quality will not be obtained in a regular paper.

[0013]

Then, the place which this invention solves such a technical problem and is made into the purpose, If a blot is high coloring few, can create the ink which has fixability in addition to coloring sufficient in the exclusive paper and is usually in ink jet recording in the paper, discharging stability is excelled further, and it is in the place which provides the water-based ink which can secure sufficient line width in printing.

[0014]

[Means for Solving the Problem]

A water-based ink of this invention adds a compound shown in a coloring material and a following formula (1) at least.

[0015]

[Formula 2]

$$\begin{array}{l} CH_2-O-(CH_2-CH_2-O)_n-H \\ | \\ R_1-C-R_2 \\ | \\ CH_2-O-(CH_2-CH_2-O)_m-H \end{array} \qquad (1)$$

R_1、R_2はそれぞれ独立して炭素数１～１０のアルキル基

m＋nが平均で２～１０

[Embodiment of the Invention]

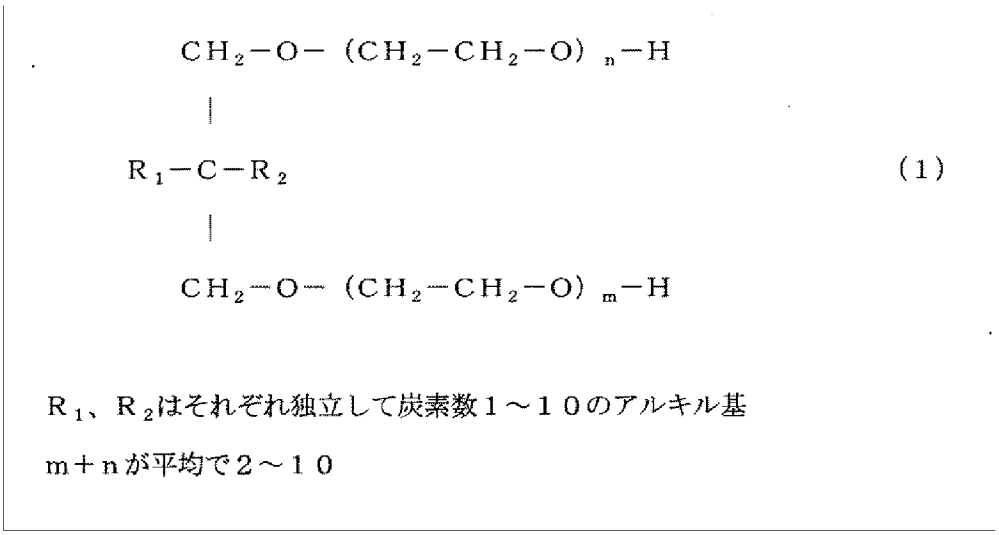
The dispersing element by this invention is excellent in stability, and, in the paper, a blot is usually high coloring few, The ink which has fixability in addition to coloring sufficient in the exclusive paper can be created, and if it is in ink jet recording, in view of the characteristics, such as excelling in the discharging stability of the ink from an ink jet head further, being demanded, it is based on the result examined wholeheartedly.

[0016]

The water-based ink of this invention adds the compound shown in a coloring material and a following formula (1) at least.

[0017]

[Formula 3]



$$\begin{array}{l} CH_2-O-(CH_2-CH_2-O)_n-H \\ | \\ R_1-C-R_2 \\ | \\ CH_2-O-(CH_2-CH_2-O)_m-H \end{array} \qquad (1)$$

R_1、R_2はそれぞれ独立して炭素数１～１０のアルキル基

m＋nが平均で２～１０

Although R_1 and R_2 are the alkyl groups of the carbon numbers 1-10 independently, respectively and m+n is 2-10 on an average in the compound of a formula (1), In the paper, a blot is high coloring few and the ink which has fixability in addition to coloring sufficient in the exclusive paper can usually be created, If it is in ink jet recording, in order to obtain the water-based ink in which it excels and which sufficient line width in printing can secure discharging stability further, the carbon number of R_1+R_2 is 15 or less [5 or more] preferably, and the ranges of m+n are 3-7 preferably.

[0018]

In this invention, a coloring material is a substance which has what is called a colored molecule, and a thing including colorant, paints, and a color is said. And as this coloring material, a color, an organic color, or an inorganic pigment can

be used conveniently.

[0019]

For example, as a color, colorant classified besides what is classified into acid dye, a direct color, reactive dye, vat dye, sulfide dye, or a food dye in a Color Index without the oil color and a basic stain can also be used. As paints, as an object for black ink, furnace black, lamp black, Carbon black (C. I. pigment black 7), such as acetylene black and channel black. Or although organic colors, such as metal, such as a copper acid ghost, iron oxide (C. I. pigment black 11), and titanium oxide, and aniline black (C. I. pigment black 1), are mentioned, carbon black which it is comparatively low-density as an object for ink jets, and cannot sediment easily underwater is preferred. As an object for color ink, the C.I. pigment yellow 1 (fast yellow G), 3, 12 (Diarylide Yellow AAA), 13, 14, 17, 24, 34, 35, 37, 42 (Synthetic Ochre), 53, 55, 74, 81, 83 (Diarylide Yellow HR), 93, 94, 95, 97, 98, 100, 101, 104, 108, 109, 110, 117, 120, 128, 138, 153, 180, the C.I. pigment red 1, 2, 3, 5, 17, and 22 (brilliant fast scarlet), 23, 31, 38, 48:2 (Permanent Red 2B (Ba)), 48:2 (Permanent Red 2B (Ca)), 48:3 (Permanent Red 2B (Sr)), 48:4 (Permanent Red 2B (Mn)), 49:1, 52:2, 53:1, 57:1 (brilliant carmine 6B), 60:1, 63:1, 63:2, 64:1, 81 (rhodamine 6G rake), 83, 88, 101 (red oxide), 104, 105, 106, 108 (cadmium red), 112, 114, 122 (Quinacridone magenta), 123, 146, 149, 166, 168, 170, 172, 177, 178, 179, 185. 190, 193, 202, 206, 209, 219, the

C.I. pigment violet 19 and 23, the C.I. pigment orange 36, the C.I. pigment blues 1, 2, and 15 (copper phthalocyanine blue R), 15:1, 15:2, 15:3 (copper phthalocyanine blue G), 15:4, 15:6 (copper phthalocyanine blue E), 16, 17:1, 56, 60, 63, the C.I. pigment greens 1, 4, 7, 8, 10, 17, and 18, and 36 grades can be used.

[0020]

Although 0.5 to 30% of an addition as paints of these is desirable when using for an ink jet also in a water-based ink, and further 1.0 to 12% is preferred, in order to obtain sufficient coloring in a regular paper like a PPC sheet, by this invention, a case where it adds not less than 3% is described. Therefore, it is an addition with most preferred 12% or less at not less than 3%. With less than 3% of addition, with an addition which it becomes impossible to have secured printing density in a regular paper, and exceeded 12%, structural viscosity arises in an increase in viscosity and the viscosity characteristic of ink, and it becomes the tendency for the discharging stability of ink from an ink jet head to worsen.

[0021]

As for a grain size of paints, 1 micrometer or less is preferred, and its paints which consist still more preferably of a 0.05-0.12-micrometer particle paints which consist of a 0.01-0.15-micrometer particle more preferably are preferred.

[0022]

Although the dispersion method can use dispersion methods, such as a method by ultrasonic dispersion, a nano mizer, jet mill, bead mill, sand mill, a roll mill, etc., it is desirable, contamination has less non-media dispersion, such as a jet mill and a nano mizer, and it is preferred.

[0023]

As for this invention, it is preferred to add a coloring material and a compound of a formula (1) at least. Sufficient print quality, preservation stability, discharging stability, and sufficient line width ********** stability in printing are securable by this.

[0024]

It is good for a carbon number to use a straight chain of 4-10 or the branching 1, and 2-alkylene glycol as a penetrating agent added simultaneously, and it is good that the addition is 1.5 to 5%. At less than 1.5%, a blot increases and print quality deteriorates. If it exceeds 5%, there is no pervious improved effect not much, and print quality will be reaching the ceiling and will become easy to generate evil of an increase in viscosity.

[0025]

When using the pigment black 7 (carbon black), in the case of phthalocyanine pigment of the pigment blue 15:3 or 15:4 grades, color enhancement in a regular paper like a PPC sheet is secured not less than 5% by making it not less than

4% not less than 3% in the case of other paints.

[0026]

And adding a surface-active agent at least to a further above-mentioned water-based ink has preferred things. It is preferred that the surface-active agent is one or more sorts chosen from an acetylene glycol system surface-active agent, an acetylene alcohol system surface-active agent, and a silicon system surface-active agent. A blot in the paper is usually further reduced by using these surface-active agents, and line width in the exclusive paper can be adjusted to a suitable grade.

[0027]

It is preferred that one or more sorts chosen from an above-mentioned acetylene glycol system surface-active agent, an acetylene alcohol system surface-active agent, and a silicon system surface-active agent are included 5% or less 0.1% or more. A thing with hypoviscosity like ink jet ink, a small dot diameter, and dynamic behavior has a preferred addition which makes dynamic surface tension 40 or less mN/m. If dynamic surface tension exceeds 40 mN/m, a blot will increase. When it exceeds 5%, an effect of print quality is leveling off, even if it adds, viscosity is hard coming to use, going up, ink adheres at a tip of a head easily, and printing is confused easily. At less than 0.1%, an effect of improvement in print quality becomes low. A more desirable addition is 0.15 to

2%.

[0028]

Adding glycol ether at least to the above-mentioned water-based ink has preferred things. Since the drying property of printing improves by these addition, and it is lost that a front printed part is transferred by rear face of the following medium even if it prints continuously, if it is especially in ink jet recording, high speed printing becomes possible.

[0029]

And it is preferred that the above-mentioned glycol ether is ten or less-repeating unit alkylene glycol, and it is alkyl ether of the carbon numbers 3-10. Also in it, it is preferred that they are JI (Tori) ethylene glycol monobutyl ether and/or (**) propylene glycol monobutyl ether. It is preferred that an addition of a substance which consists of one or more sorts chosen from the above-mentioned JI (Tori) ethylene glycol monobutyl ether and (**) propylene glycol monobutyl ether again is 0.5% or more of 30% or less. At less than 0.5%, a pervious effect is low and print quality does not improve. If it exceeds 30%, even if it will be hard coming for a viscosity rise to use and will add more, there is no effect of improvement in print quality. It is 15% or less more than per % more preferably.

[0030]

And one or more sorts chosen from an above-mentioned acetylene glycol

system surface-active agent, an acetylene alcohol system surface-active agent, and a silicon system surface-active agent at least, Adding simultaneously one or more sorts chosen from JI (Tori) ethylene glycol monobutyl ether and (**) propylene glycol monobutyl ether has preferred things. Acetylene glycol and/or an acetylene alcohol system surface-active agent, In a direction which was chosen from JI (Tori) ethylene glycol monobutyl ether and (**) propylene glycol monobutyl ether and which is used simultaneous [one or more sorts], a blot decreases in regular papers, such as a PPC sheet, and print quality improves.

[0031]

And one or more sorts chosen from an above-mentioned acetylene glycol system surface-active agent, an acetylene alcohol system surface-active agent, and a silicon system surface-active agent are 0.1%, It is preferred that one or more sorts chosen from JI (Tori) ethylene glycol monobutyl ether and (**) propylene glycol monobutyl ether are 1% or more. It is effective in raising perviousness in a small quantity by one or more sorts chosen from an acetylene glycol system surface-active agent, an acetylene alcohol system surface-active agent, and a silicon system surface-active agent. Therefore, it is 0.5% or less and print quality of one or more sorts chosen from JI (Tori) ethylene glycol monobutyl ether and (**) propylene glycol monobutyl ether improves further because it is 1% or more.

[0032]

It is preferred that polymer which contributes to distribution of the above-mentioned paints uses as the main ingredients one or more sorts chosen from a group which consists of polyacrylic ester, a styrene acrylic acid copolymer, polystyrene, polyester, polyamide, polyimide, a silicon-containing polymer, and sulfur-containing polymer. An acetylene glycol system surface-active agent, an acetylene alcohol system surface-active agent which are used by this invention, In order that a substance which consists of one or more sorts chosen from a silicon system surface-active agent, JI (Tori) ethylene glycol monobutyl ether, and (**) propylene glycol monobutyl ether may cause a dispersing agent used for the usual dispersing agent distribution, and an adsorption-and-desorption reaction, a dispersing agent from which it was desorbed floats in ink, It tends to produce a phenomenon in which printing is confused owing to. However, since polymer includes a coloring material stably by performing suitable distribution using the above-mentioned polymer, it is hard to cause adsorption and desorption.

[0033]

Adding 2-pyrrolidone further has [a water-based ink of this invention] preferred things. The stability of regurgitation improves by adding 2-pyrrolidone. The desirable addition is 15% or less more than per %. At less than 1%, even if an

effect of stability improvement of regurgitation is low and exceeds 15%, stability improvement of regurgitation is leveling off and becomes easy to come out of evil of an increase in viscosity. It is not less than 1.5% of 5% or less still more preferably.

[0034]

Since a water-based ink of this invention is a drainage system and it is easy to decompose in the usual case, An antiseptic is added further, things are preferred and it is preferred that they are one or more sorts as which the antiseptic was chosen from alkyl iso thiazolone, KURORU alkyl iso thiazolone, benziso thiazolone, bromonitroalcohol, an oxazolidine system compound, and a KURORU xylenol. Appropriate values of the addition are 0.01% - 1%. At less than 0.01%, an antiseptic effect is low, and if it exceeds 1%, it will become the tendency for the dispersion stability of a coloring material to worsen. More desirable additions are 0.02% - 0.3%. Adding a rust-proofer further again has [a water-based ink of this invention] preferred things, and it is preferred that the rust-proofer is dicyclohexyl ammonium nitrate and/or benzotriazol. Appropriate values of the addition are 0.005% - 0.5%. At less than 0.005%, a rust prevention effect is low, and if it exceeds 0.5%, it will become the tendency for the dispersion stability of a coloring material to worsen. More desirable additions are 0.008% - 0.1%.

[0035]

Adding a moisturizer further, in order to control drying and getting ink blocked with a front face of a nozzle has [a water-based ink of this invention] preferred things, It is still more preferred that the moisturizer is a substance which has hydroxyl two or more, Glycerin, a diethylene glycol, triethylene glycol, tetraethylene glycol, It is preferred that they are one or more sorts chosen from a with a number average molecular weight of 400 or less polyethylene glycol, a TORIMECHI roll alkane (six or less carbon number), an aldose, ketose, and sugar-alcohol. There are monosaccharide and polysaccharide as an example of an aldose, ketose, and sugar-alcohol, Glucose, mannose, fructose, a ribose, xylose, arabinose, Alginic acid and its salt, cyclodextrin, and cellulose else [, such as lactose, galactose aldonic acid, guru SHITOSU, malt sugar, cellobiose, sucrose, trehalose, and a maltotriose] can be used. Appropriate values of the addition are 5% - 50%. At less than 5%, a moisturizing effect is low, if it exceeds 50%, it is leveling off, viscosity becomes high, and an effect as a moisturizer does not have it. [preferred] More desirable additions are 8% - 25%.

[0036]

Adding a chelating agent further has [a water-based ink of this invention] preferred things, The chelating agent Ethylenediaminetetraacetic acid, hydroxyethylenediamine triacetic acid, It is preferred that they are glycol

etherdiamine 4 acetic acid, nitrilotriacetic acid, hydroxy ethylimino diacetic acid, a dihydroxyethyl glycine, diethylenetriamine pentaacetic acid, triethylenetetramine 6 acetic acid, and those salts. Appropriate values of the addition are 0.005% - 1%. At less than 0.005%, a chelate effect is low, and when it exceeds 1%, a chelate effect is leveling off, and it becomes the tendency for the dispersion stability of a coloring material to worsen. More desirable additions are 0.01% - 0.3%.

[0037]

Ink for ink jet recording in this invention may add various additive agents, such as a dissolution auxiliary agent, an osmosis controlling agent, a viscosity controlling agent, a pH adjuster, a dissolution auxiliary agent, an antioxidant, and an antifungal agent, for the purpose, such as stable regurgitation from the leaving stability and an ink discharge head.

[0038]

Hereafter, they are illustrated.

[0039]

It is preferred to add the existing water-soluble glycols, in order to suppress desiccation in nozzle faces, such as an ink jet, As the example, ethylene glycol, a diethylene glycol, triethylene glycol, Propylene glycol, dipropylene glycol, tripropylene glycol, A with a molecular weight of 2000 or less polyethylene glycol,

1,3-propylene glycol, There are isopropanal pyrene glycol, isobutylene glycol, 1,4-butanediol, 1,3-butanediol, 1,5-pentanediol, 1,6-hexanediol, glycerin, meso erythritol, pentaerythritol, etc.

[0040]

In addition, have water and compatibility and the solubility of soluble low glycol ether with water contained in ink and an ink component is raised, As what can be used in order to raise perviousness to a recording body, for example, a PPC sheet, furthermore or to prevent blinding of a nozzle, The alkyl alcohol of the carbon numbers 1-4, such as ethanol, methanol, butanol, propanol, and isopropanol. Ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, Ethylene glycol monobutyl ether, ethylene glycol monomethyl ether acetate, Diethylene glycol monomethyl ether, diethylene glycol monoethyl ether, Diethylene-glycol mono-n-propyl ether, ethylene glycol mono-iso-propyl ether, Diethylene-glycol mono-iso-propyl ether, ethylene glycol mono-n-butyl ether, Diethylene-glycol mono-n-butyl ether, triethylene glycol mono-n-butyl ether, ethylene glycol mono-t-butyl ether, diethylene-glycol mono-t-butyl ether, 1-methyl-1-methoxybutanol, propylene glycol monomethyl ether, Propylene glycol monoethyl ether, propylene glycol mono-t-butyl ether, Propylene glycol mono-n-propyl ether, propylene glycol mono-iso-propyl ether, Dipropylene glycol monomethyl ether, dipropylene glycol monoethyl ether, Dipropylene glycol

mono-n-propyl ether, dipropylene glycol mono-iso-propyl ether, Glycol ether, such as propylene glycol mono-n-butyl ether and dipropylene glycol mono-n-butyl ether. There are a formamide, an acetamide, dimethyl sulfoxide, sorbitol, sorbitan, glyceryl monoacetate, diacetin, a triacetin, sulfolane, etc., and these can be used, choosing them suitably.

[0041]

Since perviousness to media, such as paper and a special paper, is further controlled in ink which becomes this invention, it is also possible to add other surface-active agents. A surface-active agent to add has a preferred surface-active agent with sufficient compatibility with an ink system shown in this example, and what has it is good. [high perviousness and stable in a surface-active agent,] As the example, an ampholytic surface active agent, a nonionic surface active agent, etc. are raised. As an ampholytic surface active agent, lauryldimethyl betaine aminoacetate, 2-alkyl N-carboxymethyl N-hydroxyethyl imidazolinium betaine, There are a palm-oil-fatty-acid amide propyl dimethylamino acetic acid betaine, a polio KUCHIRUPORI aminoethyl glycine, other imidazoline derivatives, etc. As a nonionic surface active agent, polyoxyethylene nonylphenyl ether, Polyoxyethylene octylphenyl ether, polyoxyethylene dodecylphenyl ether, Polyoxyethylene alkyl aryl ether, polyoxyethylene oleylether, Polyoxyethylene lauryl ether, polyoxyethylene alkyl

ether, Ether systems, such as polyoxyalkylene alkyl ether (polyoxypropylene polyoxyethylene alkyl ether), Polyoxyethylene oleic acid, polyoxyethylene oleate, Polyoxyethylene distearic acid ester, sorbitan laurate, Sorbitan monostearate, sorbitan monooleate, sorbitansesquiolate, There are fluorine-containing detergents, such as ester systems, such as polyoxyethylene monooleate and polyoxyethylene stearate, other fluoride alkyl ester, and perfluoroalkyl carboxylate, etc.

[0042]

As a pH adjuster, a dissolution auxiliary agent, or an antioxidant, diethanolamine, Amines and those conversion things, such as triethanolamine, propanolamine, and morpholine, Mineral, such as a potassium hydrate, sodium hydroxide, and lithium hydroxide, Ammonium hydroxide, the 4th class ammonium hydroxide (tetramethylammonium etc.), Carbonic acid salts, other phosphate, such as potassium carbonate (hydrogen), sodium carbonate (hydrogen), and lithium carbonate (hydrogen), etc., Or urea, such as N-methyl-2-pyrrolidone, urea, thiourea, and tetramethylurea. Aloha, biurets, such as aloha shirt NETO, such as NETO and methyl aloha shirt NETO, biuret, dimethyl biuret, and tetramethyl biuret, have L-ascorbic acid, its salt, etc. A commercial antioxidant, an ultraviolet ray absorbent, etc. can be used. As the example, Tinuvin328 of Ciba-Geigy, 900, 1130, 384, 292, 123, 144, 622, 770 and 292, Irgacor252, 153, Irganox1010,

1076 and 1035, MD1024, etc., Or there are an oxide of a lanthanide, etc.

[0043]

As a viscosity controlling agent, rosin, alginic acid, polyvinyl alcohol, There are hydroxypropylcellulose, carboxymethyl cellulose, hydroxyethyl cellulose, methyl cellulose, polyacrylate, a polyvinyl pyrrolidone, gum arabic starch, etc.

[0044]

As for polymer which contributes to distribution of paints, it is preferred from a fixable viewpoint that it is 0.5% or more in the case of an organic color. As for a hydrophobic group of a substance which forms this polymer, it is preferred that they are one or more sorts chosen from an alkyl group, a cycloalkyl group, or an aryl group at least. And it is preferred that hydrophilic groups of a substance which has the above-mentioned hydrophilic functional group are a carboxyl group, a sulfonic group, hydroxyl, an amino group, amide groups, or those bases at least. A monomer and oligomer which have an acrylyl group which has a double bond, a methacryloyl group, a vinyl group, or an aryl group can be used as an example of a substance which forms these dispersing polymer. For example, styrene, tetrahydrofurfuryl acrylate, butyl methacrylate, alpha, and (2,3 or 4)-alkyl styrene, alpha, and (2,3 or 4)-alkoxy styrene, 3,4-dimethylstyrene, alpha-phenylstyrene, divinylbenzene, Vinylnaphthalene, dimethylamino (meta) acrylate, dimethylaminoethyl (meta) acrylate, Dimethylaminopropylacrylamide, N,

and N-dimethylamino ethyl acrylate, Acryloyl morpholine, N,N-dimethylacrylamide, N-isopropylacrylamide, N,N-diethylacrylamide, methyl (meta) acrylate, ethyl (meta) acrylate, Propyl (meta) acrylate, ethylhexyl (meta) acrylate, In addition, alkyl (meta) acrylate, methoxy diethylene-glycol (meta) acrylate, Acrylate (meta) of a diethylene glycol of an ethoxy basis, a propoxy group, and a butoxy group, or a polyethylene glycol, cyclohexyl (meta) acrylate, benzyl (meta) acrylate, phenoxyethyl (meta) acrylate, isoBONIRU (meta) acrylate, Hydroxyalkyl (meta) acrylate, other fluorine-containing ** chlorinated, Silicon-containing (meta) acrylate, acrylamide (meta), maleic acid amide, (Meta) When the structure of cross linkage other than one organic functions, such as acrylic acid, is introduced (mono- **.) JI, Tori, tetra, poly ethylene glycol di(metha)acrylate, 1,4-butanediol, 1,5-pentanediol, 1,6-hexanediol, Acrylate, such as 1,8-octanediol and 1,10-Deccan diol (meta), TORIMECHI roll pro pantry (meta) acrylate, glycerin () [JI and] Tori (meta) acrylate, bisphenol A, or di(meth)acrylate of an ethylene oxide addition of F, A compound which has acrylic groups, such as neopentyl glycol di(metha)acrylate, pentaerythritol tetra (meta) acrylate, and dipentaerythritol hexa (meta) acrylate, and an methacrylic group can be used.

[0045]

It can also create adding these polymer so that one or more sorts chosen from a

group which consists of polyacrylic ester, a styrene acrylic acid copolymer, polystyrene, polyester, polyamide, polyimide, a silicon-containing polymer, and sulfur-containing polymer may be used as the main ingredients.

[0046]

Besides potassium persulfate or ammonium persulfate, a polymerization initiator Hydrogen persulfate and azobisisobutyronitrile, A common initiator used for radical polymerizations, such as benzoyl peroxide, hyperoxidation dibutyl, peracetic acid, cumene hydroperoxide, t-butylhydroxy peroxide, and PARAMEN tongue hydroxy peroxide, can be used.

[0047]

A chain transfer agent can also be used in an emulsion polymerization in this invention. Besides t-dodecyl mercaptan, for example, n-dodecyl mercaptan, N-octyl mercaptan, dimethyl xantho gene disulfide which is xantho genes, diisobutyl xantho gene disulfide or a dipentene, indene, 1,4-cyclohexadiene, dihydrofuran, a xanthene, etc. are mentioned.

[0048]

And it can be considered as a water-based ink which was excellent in stability by using the above-mentioned dispersing element. A carbon number to 1,2-alkanediol which is 6 and which may branch. There is 1,2-hexandiol, 4-methyl-1,2-pentanediol, 3-methyl-1,2-pentanediol, 2-methyl-1,2-pentanediol,

1-methyl-1,2-pentanediol, 3, and 3-dimethyl- 1,2-butanediol.

[0049]

In this invention, polymer particles can also be added as an essential ingredient. The addition is 0.1% or more of 10% or less. It is not less than 2% of 6% or less still more preferably 8% or less more than per % more preferably. At less than 0.1%, there are few effects of improvement in scuff resistance, and if 10% is exceeded, viscosity of ink will rise and it will become difficult to use it as ink for ink jet recording. However, especially by this invention, an addition which can demonstrate the characteristics by the polymer particles, such as fixability and color enhancement, also in these states not less than 2%.

[0050]

It distributes to indifferent water and polymer particles form an emulsion. as the substance which forms polymer particles -- everything but styrene, tetrahydrofurfuryl acrylate, and butyl methacrylate (alpha.) 2, 3 or 4-alkyl styrene, alpha, and (2, 3 or 4)-alkoxy styrene, 3, 4-dimethylstyrene, alpha-phenylstyrene, divinylbenzene, Vinylnaphthalene, dimethylamino (meta) acrylate, dimethylaminoethyl (meta) acrylate, Dimethylaminopropylacrylamide, N, and N-dimethylamino ethyl acrylate, Acryloyl morpholine, N, and N-dimethylacrylamide, N-isopropylacrylamide, N and N-diethylacrylamide, methyl (meta) acrylate, ethyl (meta) acrylate, Propyl (meta) acrylate, ethylhexyl

(meta) acrylate, In addition, alkyl (meta) acrylate, methoxy diethylene-glycol (meta) acrylate, Acrylate (meta) of a diethylene glycol of an ethoxy basis, a propoxy group, and a butoxy group, or a polyethylene glycol, cyclohexyl (meta) acrylate, benzyl (meta) acrylate, phenoxyethyl (meta) acrylate, IsoBONIRU (meta) acrylate, hydroxyalkyl (meta) acrylate, In addition, fluorine-containing ** chlorinated, silicon-containing (meta) acrylate, acrylamide (meta), When the structure of cross linkage other than one organic functions, such as maleic acid amide and acrylic acid (meta), is introduced (mono- **.) JI, Tori, tetra, poly ethylene glycol di(metha)acrylate, 1, 4-butanediol, 1, 5-pentanediol, 1, 6-hexandiol, Acrylate, such as 1 and 8-octanediol and 1, and 10-Deccan diol (meta), TORIMECHI roll pro pantry (meta) acrylate, glycerin () [JI and] Tori (meta) acrylate, bisphenol A, or di(meth)acrylate of an ethylene oxide addition of F, Neopentyl glycol di(metha)acrylate, pentaerythritol tetra (meta) acrylate, dipentaerythritol hexa (meta) acrylate, etc. can be used.

[0051]

As an emulsifier used in order to form such polymer particles, besides sodium lauryl sulfate or lauryl sulfate of potash, an anionic surface active agent, A nonionic surface active agent and an ampholytic surface active agent can be used, and the surface-active agents which can be added in the above-mentioned ink can be used. Besides potassium persulfate or ammonium

persulfate, a polymerization initiator Hydrogen persulfate and azobisisobutyronitrile, Benzoyl peroxide, hyperoxidation dibutyl, peracetic acid, cumene hydroperoxide, t-butylhydroxy peroxide, PARAMEN tongue hydroxy peroxide, etc. were able to be used. As a chain transfer agent for a polymerization, besides t-dodecyl mercaptan, n-dodecyl mercaptan, N-octyl mercaptan, dimethyl xantho gene disulfide which is xantho genes, diisobutyl xantho gene disulfide or a dipentene, indene, 1, 4-cyclohexadiene, dihydrofuran, a xanthene, etc. can be used.

[0052]

[Example]

Next, the case of the ink for ink jet recording is explained to an example about a concrete example etc. Although the case where polymer particles are added further is described hereafter, using paints as a coloring material, even when using neither the case where a color is used, nor polymer particles, as a coloring material, it is satisfactory at all.

(Manufacture of a pigment dispersion object)

First, the dispersing element 1 uses the monarch 880 (made by Cabot) which is carbon black. After carrying out the nitrogen purge of the reaction vessel which offered the agitator, the thermometer, the refluxing pipe, and the dropping funnel, 20 copies of styrene, five copies of alpha-methylstyrene, 15 copies of butyl

methacrylate, Put in ten copies of lauryl methacrylate, two copies of acrylic acid, and 0.3 copy of t **DODE sill mercaptan, and it heats at 70 **, 150 copies of styrene, 15 copies of acrylic acid, 50 copies of butyl methacrylate which were prepared independently, The polymerization reaction of the dispersing polymer is carried out putting one copy of t-dodecyl mercaptan, 20 copies of methyl ethyl ketone, and three copies of azobisisobutyronitriles into a dropping funnel, and being dropped at a reaction vessel over 4 hours. Next, methyl ethyl ketone is added to a reaction vessel, and the dispersing polymer solution of concentration is created 40%.

[0053]

The monarch 880 (made by Cabot Corp.) 30 copy which is the carbon black which carried out grinding treatment to 40 copies of above-mentioned dispersing polymer solutions by the nano mizer (product made from the Yoshida machine industry) for 1 hour, 100 copies of sodium hydroxide solution of 0.1 mol / L and 30 copies of methyl ethyl ketone are mixed, and it stirs with a homogenizer for 30 minutes. Then, 300 copies add and ion exchange water is stirred for further 1 hour. And the whole quantity of methyl ethyl ketone and some water are distilled off using a rotating evaporator, After neutralizing by sodium hydroxide of 0.1 mol/L and adjusting the pH to 9, it filters with a 0.3-micrometer membrane filter, and solid content (dispersing polymer and carbon black) considers it as 20% of

dispersing element 1.

[0054]

The dispersing elements 2-4 are obtained by the same technique as the above. The dispersing element 2 uses the pigment blue 15:4 (made by Clariant). The dispersing element 3 uses the pigment red 122 (made by Clariant). The dispersing element 4 uses the pigment yellow 74 (made by Clariant).

(Manufacture of polymer particles)

A reaction vessel is equipped with a dropping device, a thermometer, a water cooling type reflux condenser, and an agitator, 100 copies of ion exchange water is put in, and 0.2 copy is added for potassium persultate of the polymerization initiator by 70 ** of nitrogen atmospheres, stirring. The monomer solution which put 0.05 copy, five copies of styrene, six copies of tetrahydrofurfuryl acrylate, five copies of butyl methacrylate, and t-dodecyl mercaptan 0.02 into seven copies of ion exchange water for sodium lauryl sulfate is dropped at 70 **, is made to react, and a primary substance is created. To the primary substance, two copies of 10% of ammonium persulfate solutions are added and stirred, Furthermore, 30 copies of ion exchange water, 0.2 copy of lauryl sulfate of potash, 30 copies of styrene, 15 copies of butyl methacrylate, 16 copies of butyl acrylate, two copies of methacrylic acid, After adding and carrying out a polymerization reaction, stirring the reaction mixture which consists of one copy of polyethylene-glycol

200 dimethacrylate, and 0.5 copy of t-dodecyl mercaptan at 70 **, The polymer-particles solution A of 30% of the concentration which ammonia neutralized, was set to pH 8.5 and filtered with a 0.3-micrometer filter is created.

(Creation of the ink for ink jet recording)

As a compound of a formula (1), DMH-40 (made by Japan emulsifier incorporated company) was used.

[0055]

Ink solution B Addition (%)

DMH-40 3.0

ORUFIN E1010 (made by Nissin Chemical) 0.6

2-pyrrolidone 2.0

Triethylene glycol 2.0

Trimethylolpropane 5.0

Glycerin 8.0

Ethylenediaminetetraacetic acid 2 Na salt 0.02

Benzotriazol 0.01

Methyliso thiazolone 0.1

Ion exchange water 19.27

Let the above mixture be the ink solution B.

[0056]

Example 1 Addition (% of the weight)

Dispersing element 1 (105) 37.5

Above-mentioned polymer-particles solution A 14.0

Above-mentioned ink solution B 40.0

Triethanolamine 0.8

Ion exchange water Residue

Example 2 Addition (% of the weight)

Dispersing element 2 (85) 22.5

Above-mentioned polymer-particles solution A 5.0

Above-mentioned ink solution B 40.0

Ion exchange water Residue

Example 3 Addition (% of the weight)

Dispersing element 3 (90) 27.5

Above-mentioned polymer-particles solution A 5.0

Above-mentioned ink solution B 40.0

Ion exchange water Residue

Example 4 Addition (% of the weight)

Dispersing element 4 (80) 25.0

Above-mentioned polymer-particles solution A 4.0

Above-mentioned ink solution B 40.0

Ion exchange water Residue

Example 5 Addition (% of the weight)

Dispersing element 1 (105) 15.0

Above-mentioned polymer-particles solution A 15.0

Above-mentioned ink solution B 40.0

Triethanolamine 0.9

Ion exchange water Residue

Example 6 Addition (% of the weight)

Dispersing element 2 (90) 25.0

Above-mentioned polymer-particles solution A 5.0

Above-mentioned ink solution B 40.0

Ion exchange water Residue

Example 7 Addition (% of the weight)

Dispersing element 3 (90) 25.0

Above-mentioned polymer-particles solution A 5.0

Above-mentioned ink solution B 40.0

Ion exchange water Residue

Example 8 Addition (% of the weight)

Dispersing element 4 (95) 27.5

Above-mentioned polymer-particles solution A 5.0

Above-mentioned ink solution B 40.0

Ion exchange water Residue

The presentation of the ink used for the comparative example becomes below. The paints shown according to a comparative example used the carbon black distributed using the random copolymerization type styrene acrylic acid series dispersing agent. The mean particle diameter of paints is shown in () per nm.

[0057]

Comparative example 1 Addition (% of the weight)

Water-soluble paints 9 (90) 5.0

Glycerin 10.0

Dispersing agent 3.0

Non-ion system surface-active agent 1.0

Ion exchange water Residue

Comparative example 2 Addition (% of the weight)

Water soluble dye (food black 2) 5.5

DEGmME 7.0

Diethylene glycol 10.0

2-pyrrolidone 5.0

Ion exchange water Residue

DEGmME: Diethylene glycol monomethyl ether

Comparative example 3 Addition (% of the weight)

Water-soluble paints 11 (110) 5.5

Water soluble dye (food black 2) 2.5

Diethylene glycol 10.0

Non-ion system surface-active agent 1.0

Ion exchange water Residue

The distributed paints and water soluble dye of the above-mentioned comparative example showed a net quantity, using the general acrylic styrene system dispersing agent, using the bead mill, diethylsulfosuccinic acid Na and a dispersing agent performed distribution for 2 hours, and the non-ion system surface-active agent created them.

[0058]

The evaluation result of a blot is shown in Table 1 as print quality when a character is printed as an evaluation result of printing. Measurement of printing evaluation is performed by using ink jet printer EM-930C by SEIKO EPSON incorporated company. The index of evaluation of a blot sets to D what has C and four or more place relation in some which have B, two places, and three-place relation in some which have A and one-place relation in a thing without relation of the character of "writing" with 8 dot matrices. Relation means here the state where ink spreads along with the textiles of paper and the

character horizontal line of "writing" is connected.

[0059]

[Table 1]

印字品質評価結果

	実施例								比較例		
	1	2	3	4	5	6	7	8	1	2	3
Conqueror	A	A	A	A	A	A	A	A	C	C	C
Favorit	A	A	A	A	A	A	A	A	D	D	D
Modo Copy	A	A	A	A	A	A	A	A	D	D	D
Rapid Copy	A	A	A	A	A	A	A	A	D	D	D
EPSON EPP	A	A	A	A	A	A	A	A	C	C	C
Xerox P	A	A	A	A	A	A	A	A	C	C	D
Xerox 4024	A	A	A	A	A	A	A	A	D	D	D
Xerox 10	A	A	A	A	A	A	A	A	C	D	D
Neenha Bond	A	A	A	A	A	A	A	A	C	D	D
Ricopy6200	A	A	A	A	A	A	A	A	D	C	D
Yamayuri	A	A	A	A	A	A	A	A	D	D	D
Xerox R	A	A	A	A	A	A	A	A	D	D	D

Ink which is used by a comparative example so that clearly from the result of Table 1 has bad print quality, and when the ink for ink jet recording used by this invention is used, it is understood that print quality is good. The paper used for these evaluations in the paper in which Europe, the United States, and Japan

are marketed Conqueror paper, They are Favorit paper, Modo Copy paper, Rapid Copy paper, EPSON EPP paper, Xerox 4024 paper, Xerox 10 paper, Neenha Bond paper, Ricopy 6200 paper, **********, and Xerox R paper.

[0060]

As mentioned above, the quality and high ink for ink jet recording of practicality in which the blot to recording bodies, such as paper of a printing image, is reduced in this invention can be provided.

[0061]

The dispersing agent as the polymer B which contributes to the pigment concentration as the colorant A and distribution of the paints and the addition of the polymer particles C and the chroma saturation (C^*) as color enhancement, the depth of shade (OD), and the evaluation result of fixable and discharging stability are shown in Table 2. The example to which A, B, and C were changed in the presentation of Examples 1-4 is shown.

[0062]

The chroma saturation (C^*) as color enhancement and the depth of shade (OD) are measured by product Colorcon trawl system SPMmade from GURETAKU 50. Fixability looks at and judges the flow condition of the ink of the solid part when 300 g of load is ****(ed) using the bold letter portion of the zebra highlighter pen made from a zebra for the portion in which a 1-cm square meter carried out solid

printing and a line is drawn using SEIKO EPSON PM photographic paper. What has an ink flow exceeding C and 1 mm in some which have B and a 0.5-1-mm ink flow in some which have an ink flow below A and 0.5 mm - in a thing without an ink flow is set to D. Discharging stability uses ink jet printer EM-930C by SEIKO EPSON incorporated company, Carry out 100-page continuous printing of the character to A4 version Xerox P paper at a rate of 2000 characters/page with the style standard size 10 next morning [of the word of Microsoft Corp. / MS], and what does not produce print disorder A, What has C and 100 or more place print disorder in some which have B and ten or more place less than 100-place print disorder in a thing with less than ten-place print disorder is set to D.

[0063]

[Table 2]

色剤、ポリマーおよび高分子微粒子の添加量とC*、OD、耐擦性および吐出安定性の結果

	色剤	ポリマー	高分子微粒子	C*	OD	耐擦性	吐出安定性
実施例1	6	0	4	—	1.40	A	A
	6	0.5	3	—	1.38	A	A
	3	0	5	—	1.10	A	A
	7	0	0	—	1.40	D	A
	2.5	0.5	0	—	0.90	C	A
	12	4	5	—	1.40	B	D
実施例2	4	4	2	51	1.21	A	A
	3.5	0.5	4	48	1.20	A	A
	3	0	5	45	1.12	A	A
	4	0	0	35	1.20	D	A
	2.5	0.2	0	35	1.00	B	A
	8	8	5	48	1.20	A	D
実施例3	6	1.5	2	61	1.21	A	A
	5	0.5	3	58	1.20	A	A
	3	0	5	51	1.11	A	A
	6	0	0	40	1.20	D	A
	2.5	0.2	0	39	1.00	B	A
	13	3	3	59	1.20	B	D
	10	5	6	56	1.20	A	D
実施例4	6	2.5	2	92	1.21	A	A
	5	0.5	3	85	1.20	A	A
	3	0	6	70	1.11	A	A
	5	0	0	61	1.20	D	A
	2.5	0.2	0	60	1.00	B	A
	13	3	6	88	1.20	C	D
	10	5	6	85	1.21	B	D

As the result of Table 1 and 2 shows, a coloring material is not less than 3% of 12% or less, The sum total of polymer and polymer particles contributed to distribution of the paints is not less than 2% of 10% or less, When polymer particles are not less than 2%, and coloring-material + polymer + polymer particles are not less than 8% of 20% and the compound of a formula (1) is 1.5 to 5%, in the paper, a blot is usually high coloring few, In addition to coloring sufficient in the exclusive paper, it turns out that the ink which has fixability can be created. It cuts that a coloring material is not desirable since OD and chroma saturation become low at less than 3%. The addition of the paints which are coloring materials exceeds 12%, or the total quantity of the polymer which contributes to distribution of paints, and polymer particles exceeds 10%, or, It turns out that neither OD nor chroma saturation improves even if the total quantity of the polymer B which contributes to the addition of the paints which are coloring materials, and distribution of paints, and polymer particles exceeds 20%, and discharging stability becomes is hard to be acquired conversely. Although it is preferred that a higher value is shown as for OD or chroma saturation, OD with black (pigment black 7) 1.3 or more. It is a value or more with 1.1 [preferred with 1.1 or more and yellow (pigment yellow 74)] in 1.1 or more and magenta (pigment red 122) with cyanogen (pigment blue 15:4). Similarly, since black is colorless, chroma saturation is not related, but 50 or more and

yellow of cyanogen are values in which 70 or more are preferred as for 40 or more and magenta.

[0064]

The result of having evaluated the discharging stability from the addition and ink jet head of 2-pyrrolidone in Examples 1-8 is shown in Table 3. Discharging stability is based on the same valuation method as what is shown in Table 2.

[0065]

[Table 3]

吐出安定性の評価結果

ピロリドン添加量 (%)	0	0. 5	1	2	3	4
実施例1	C	B	A	A	A	A
実施例2	C	B	A	A	A	A
実施例3	D	B	A	A	A	A
実施例4	C	B	A	A	A	A
実施例5	C	B	A	A	A	A
実施例6	C	B	A	A	A	A
実施例7	C	B	A	A	A	A
実施例8	C	B	A	A	A	A

It turns out that discharging stability improves by addition of 2-pyrrolidone so that

the result of Table 3 may show.

[0066]

The relation of blinding when a kind, an addition, etc. of a moisturizer (triethylene glycol (TEG), trimethylolpropane (TMP), and glycerin (GL)) in Examples 5-8 are changed is shown in Table 4. The cartridge for EM930C is filled up with the ink of Examples 1-4, it is neglected for three months under 40 **20% of environment, and blinding is cleaning operation (it is the mechanism with which the printer is usually equipped, and). a dot omission is recovered -- making -- it is because the number of times which all the choked nozzles recover is measured. What does not recover what recovers what recovers what is recovered by less than 4 times by A and 4 to 5 times by B and 5 times - 10 times even if it exceeds C and 10 times is set to D.

[0067]

[Table 4]

目詰まりの測定結果

TEG量(%)	0	0	0	2	2	2	2	2	2	2	4	4
TMP量(%)	0	0	2	2	0	0	2	2	4	6	4	6
GL添量(%)	0	4	8	4	8	10	10	12	10	8	8	6
実施例1	D	D	C	C	C	B	A	A	A	A	A	A
実施例2	D	D	C	C	C	B	A	A	A	A	A	A
実施例3	D	D	D	D	D	C	B	A	A	A	A	A
実施例4	D	D	D	D	D	C	B	A	A	A	A	A
実施例5	D	D	C	C	C	B	A	A	A	A	A	A
実施例6	D	D	C	C	C	B	A	A	A	A	A	A
実施例7	D	D	D	D	D	C	B	A	A	A	A	A
実施例8	D	D	D	D	D	C	B	A	A	A	A	A

It turns out that blinding recoverability improves by adding a moisturizer so that the result of Table 4 may show. It turns out that especially the addition of a moisturizer shows the whole blinding recoverability good at not less than 14%. Since viscosity will rise if this moisturizer also has too many additions, it is necessary to adjust suitably.

[0068]

Adding a surface-active agent and glycol ether further in this invention has preferred things. It is good to add above surface-active agents and glycol ether, and to make dynamic surface tension into 40 or less mN/m. The substance which makes dynamic surface tension 40 or less mN/m besides 1 shown in an

example, 2-hexandiol, and ORUFIN E1010, ORUFIN STG (made by Nissin Chemical Industry) in an acetylene glycol system surface-active agent, ORUFIN D61 (made by Nissin Chemical Industry) in an acetylene alcohol system surface-active agent, BYK347 in a silicon system surface-active agent, 348 (product made from big KEMI), The 4-methyl- 1, 2-pentanediol (MPD), 1, 2-hexandiol (1, 2-HD), Diethylene-glycol monobutyl ETERUJI (DEGmBE), propylene glycol monobutyl ether (PGmBE), dipropyleneglycol monobutyl ether (DPGmBE), etc. are mentioned. The example in the desirable gestalt which used these substances for below instead of 1 shown in Example 1, 2-hexandiol, and ORUFIN E1010 is given.

[0069]

ORUFIN STG (made by Nissin Chemical Industry) which is other additive agents it is supposed that those additions and this inventions may be sufficient instead of the compound of the formula (1) in the presentation of Example 1, TEGmBE, and ORUFIN E1010, D61 (made by Nissin Chemical Industry), BYK347 (product made from big KEMI), the 4-methyl- 1, 2-pentanediol (MPD), 1,2-hexandiol (1,2-HD), diethylene-glycol monobutyl ETERUJI (DEGmBE), Propylene glycol monobutyl ether (PGmBE), the case where the additive agent it is supposed that this invention may be sufficient is added in the ink created using the substance which consists of one or more sorts chosen from dipropyleneglycol monobutyl

ether (DPGmBE), and the ink shown according to the comparative example 1 -- (Examples 9-18 of Table 5) -- it being neglected in one week in 70 ** /, and similarly, The result investigated about the generating foreign matter of the ink after neglect, a property value (viscosity, surface tension), and discharging stability is shown in Table 5. The amount of foreign matter generations the amount of foreign matters of the amount of foreign matters / first stage after 70 ** neglect, and viscosity The viscosity of the viscosity/first stage after 70 ** neglect, Surface tension shows the value of the surface tension of after [70 ** neglect] surface tension / first stage, and discharging stability uses ink jet printer EM-930C by SEIKO EPSON incorporated company, What carries out 100-page continuous printing of the character to A4 version Xerox P paper at a rate of 2000 characters/page with the style standard size 10 next morning [of the word of Microsoft Corp. / MS], and does not produce print disorder etc. at all A, What has C and 100 or more place print disorder in some which have B and ten or more place less than 100-place print disorder in a thing with less than ten-place print disorder is set to D. DEGmBE it is supposed that this invention may be sufficient, E1010, ORUFIN STG, Each substance, such as ORUFIN D61, BYK347, the 4-methyl- 1, 2-pentanediol (MPD), TEGmBE, PGmBE, and DPGmBE, can reduce dynamic surface tension with the addition of the grade which a molecular weight shows in Table 5 small. Measurement of dynamic

surface tension was measured using the theta t60 (made by Hidehiro energy machine incorporated company) which used maximum bubble pressure method.

[0070]

[Table 5]

実施例１および比較例２の組成で添加剤を変えたときの発生異物、物性値（粘度、表面張力）および吐出安定性

添加剤	実施例	9	10	11	12	13	14	15	16	17	18
DEGmBE		5		5			6	10			
TEGmBE			8		7				8		
PGmBE				2							
DPGmBE					2			3			
MPD						3			2		2
1, 2−HD							5				5
BYK347			0. 1	0. 1		0. 1				0. 1	
オルフィンSTG		0. 5			0. 5			1	0. 5		
サーフィノール61							0. 5		0. 5		
実施例1	異物発生	1	1	1	1	1	1	1	1	1	1
	粘度	1	1	1	1	1	1	1	1	1	1
	表面張力	1	1	1	1	1	1	1	1	1	1
	吐出安定性	A	A	A	A	A	A	A	A	A	A
比較例1	異物発生	12	5	15	12	4	25	30	22	1. 4	2. 3
	粘度	6	5	4	3. 8	1. 4	12	25	28	1. 2	2. 2
	表面張力	1. 0	1. 1	1	1. 1	1	1	1. 1	1. 1	1	1
	吐出安定性	D	D	D	D	C	D	D	D	C	C

As the above result shows, the water-based ink which becomes this invention is

good print quality, and it turns out that it becomes ink for ink jet recording which is excellent in discharging stability and preservability stability. When examined by changing an additive agent similarly also about Examples 2-8, the almost same result was obtained. However, when not using the compound of a formula (1), and it prints using EM930C, it becomes 90% or less, and sufficient line width is not obtained, but mixed colors of line width with other colors also increase. When sufficient line width is not obtained, the line of the shape of a white muscle goes into the portion of solid printing, and it is not desirable. This tendency is the same even when using a color as the case where polymer particles are not used, or a coloring material.

[0071]

Various change is possible, unless it should not think that this invention is limited to these examples but deviates from the main point of this invention.

[0072]

[Effect of the Invention]

As stated above, in the paper, there are few blots and this invention is usually high coloring, In addition to coloring sufficient in the exclusive paper, the ink which has fixability can be created, and if it is in ink jet recording, it has the effect of enabling creation of the water-based ink which can secure sufficient line width in discharging stability **** and printing further.